



Task 4 (April)

Easter Egg Hunt

Easter is approaching, and the garden is full of hidden eggs. Our robot rabbit has an important job: it must walk along the garden path and count how many eggs it finds along the way. When it finishes its round, it should report the total number of eggs it has discovered.

Your task is to program the mBot2 robot so that it follows a closed loop made from a black line and counts objects placed near the path (minimum length **1,8 m**). Along the **outer** side of the loop, place **between 1 and 5 objects** representing Easter eggs. These objects can be small items such as balls, Lego pieces, chocolate or 3D printed eggs etc. They should be placed **randomly near the line** (distance 5-15cm), so that the robot can detect them using its sensors while following the track.

The robot must navigate along the line and detect each object once while passing it. After completing the loop, the robot should stop and **display the number of detected objects on the robot display**. To ensure reliable performance, perform **at least three runs** of the experiment with **different random placements of the objects**. Record the robot's behaviour and results for each run.

The robot must be able to recognize that the loop has been completed. For example, the start/finish position may be marked by a **distinctive colored marker** placed next to the line or line break or any other reasonable way. Clearly explain how your robot detects the end of the loop.

If needed, you may design and build additional mechanical parts for your robot. For example, you may print eggs, simple stands for the eggs or design a holder that positions the **ultrasonic sensor on the side of the robot** so that it can detect objects next to the track. Attachments made using a **3D printer** are welcome, but simple constructions from cardboard or other materials are also acceptable.

Your submission must include a short description of your solution, a video showing the robot performing the task, several photos documenting the setup and development process, and the program used to control the robot.

Tips

- As a track you may use the poster included in the mBot2 kit. Of course, you can create your own one using the black tape, just remember the total length of the loop must be at least 1,8 m.
- It is also important to think about how the robot will recognize the **start and end of the loop**, and how you will ensure that objects are placed in positions where the robot's sensor can detect them reliably.
- Test your solution several times with **different placements of objects** to make sure your robot works consistently.
- A simple **line-following example program** will be provided to help you get started. You may use it directly or modify it according to your needs or decide completely different solution.
- If the task seems too difficult, start with a simplified version robot will start and stop manually, the robot may **produce one beep for each detected object** instead of showing the number on the display etc. Send us also a partial solution, it may be worth some points.



Illustration photo by Susanne Jutzeler, suju-foto